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United States Coast Guard

Commanding Officer
USCGC HEALY (WAGB-20)

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HEALYINST 3530.1A
16 JUN 2006

USCGC HEALY INSTRUCTION 3530.1A

Subj: USCGC HEALY (WAGB 20) NAVIGATION STANDARDS

Ref: (a) Cutter Navigation Standards and Procedures, COMDTINST M3530.2(Series)
(b) U.S. Coast Guard Regulations, COMDTINST M5000.3(Series)
(c) Standing Orders to the Officer of the Deck, HEALYINST 1603.1(Series)
(d) Instructions of Use of U. S. Navy Standard Bearing Book
(e) Nautical Charts and Publications Allowance, COMDTINST M3140.5(Series)
(f) The American Practical Navigator (1995)
(g) Dutton's Navigation and Piloting
(h) Watch Officer Guide

1. PURPOSE. This instruction establishes navigation standards and procedures for USCGC HEALY.

2. ACTION. All personnel involved in navigating or conning HEALY are required to adhere to these standards and references (a) through (c) as well as have thorough knowledge and understanding of references (d) through (h).

3. DIRECTIVES AFFECTED. HEALYINST 3530.1 is cancelled.

4. DISCUSSION. Navigating a ship safely requires diligent adherence to standards of accuracy and precision, especially when operating in close proximity to shoal water or land. The use of standard procedures, terminology and symbology is imperative to ensure continuity and common understanding among all bridge personnel.

5. DEFINITIONS.

   a. Navigational Draft – The navigational draft for HEALY is designated as 36 feet, which is equivalent to 6 fathoms or 11 meters.

   b. Shoal Water – Those waters with a charted depth at mean low water of 36 feet (6 fm/11 m) or less.

   c. Restricted Waters – Those waters less than 2 nm from land or shoal water, where hazards make necessary frequent or continuous positioning and close attention to depth of water with respect to draft.

   d. Piloting Waters - Those waters between 2 – 6 nm from land or shoal water, where it is necessary to establish the ship's position often. Piloting waters also include the Strait of Juan de Fuca west of Port Angeles.

e. Open Waters – Normally those waters beyond 6 nm from land or shoal water.

f. Estimated Position – A position determined by two lines of position from any means other than LORAN.

g. Definitions of other terms associated with navigation may be found in the references, particularly (e) and (f).

6. NAVIGATION TEAM COORDINATION. HEALY's bridge watch organization will be staffed on a situational basis. The basic underway watch is comprised of an OOD and a bridge watch-stander, and will be augmented as necessary. The following table outlines the augmentation based on navigational situation.

	Day (0800-2000)	Night (2000-0800)	Restricted Visibility
Open Water >6NM from shoal waters	OOD Watchstander	OOD JOOD Watchstander	OOD JOOD Watchstander
Piloting Waters 2-6NM from shoal waters	OOD JOOD Watchstander	OOD JOOD Watchstander	OOD JOOD Nav Evaluator Watchstander
Restricted Waters <2NM from shoal waters	OOD JOOD Nav Evaluator Watchstander	OOD JOOD Nav Evaluator Watchstander	OOD JOOD Nav Evaluator Watchstander
Ice	OOD JOOD	OOD JOOD Watchstander	OOD JOOD Watchstander

Note: When in restricted waters, when the navigation detail would normally be set, the Operations Officer and Commanding Officer or Executive Officer will also be on the bridge. In areas of heavy traffic a shipping officer will be added to the bridge team. The Navigation (Nav) Evaluator will monitor the ECDIS-N and ECS and compare them with radar and other means, making periodic reports to the Conning Officer when appropriate. The Nav evaluator's recommended script is attached as enclosure (10).

7. NAVIGATION STANDARDS.

a. Navigation will normally be conducted using the installed ECDIS-N system, with the ECS as backup. The navigator will create chart portfolios and voyage plans for all transits using the best electronic chart available. HEALY's hierarchy of electronic chart products for the ECDIS-N and ECS are:

(1) National Geospatial Intelligence Agency Digital Nautical Charts (DNC)
(2) United Kingdom Hydrographic Office, Admiralty Charts (ARCS)
(3) NOAA Raster, as appropriate for specific area (BSB Format)

b. The navigator must authorize any changes to an active or stored voyage plan. OOD may create and execute temporary plans when deviation from the active plan is necessary.

c. The radar overlay feature of the VMS shall be used periodically to compare the graphical display of HEALY's position and the position of other features (fix aids, land, etc.) to the radar display.

d. Use of the U. S. Navy Standard Bearing Book is not required when navigating with the ECDIS-N as all required data is recorded by the system. Its use is required, for positions plotted on paper charts. The Standard Bearing Book shall be maintained in accordance with reference (d).

e. Paper charts will be available on the forward chart table for reference and tertiary backup. Paper charts will be maintained in accordance with reference (a) and as follows:

(1) Shoal water will be clearly marked (highlighted with a blue felt pen).
(2) Tracklines will be labeled with true course and distance.
(3) Each chart will be marked to indicate shift chart points.
(4) A distinct notation indicating that the chart is corrected and up to date with both NGA NTM and CG LNTM will be made in the lower left-hand margin of the chart.
(5) Chart corrections shall be made by the Navigator prior to primary use.

f. Navigation briefs will be conducted prior to getting underway or entering port. References (a) and (f) provide guidelines for conducting navigation briefs.

g. Regardless of the navigation system used, HEALY will use the following hierarchy of positioning sources:

(1) DGPS
(2) PPS GPS
(3) GPS/Glonass
(4) 3D GPS
(5) GPS
(6) Radar
(7) Visual
(8) LORAN C

h. Fix Intervals. The installed ECDIS-N and ECS provide virtually instantaneous position information. If neither is operational, positions will be plotted on a paper chart at the following intervals.

(1) Restricted Waters	3 min
(2) Piloting Waters	15 min
(3) Open Waters	30 min

i. Whenever possible the VMS safety checker will be set using the following values:

(1) Lookahead Time: 15 minutes
(2) Safety Depth: 11 meters
(3) Safety Height: 42 meters

j. Gyro error shall be determined by amplitude daily, weather permitting and confirmed routinely upon crossing a terrestrial range.

k. Compass checks comparing gyro heading will be recorded in the Navigation Data Page as each fix is taken and at every course change. A check is not required every time the VMS adjusts heading to maintain a track.

l. Standard Helm, Line, EOT, Bow Thruster, DP and Anchoring commands are attached as enclosures (1) through (4).

m. Standard navigation fix plotting symbols for paper charts are attached as enclosure (5).

n. Checklists for getting underway and entering port/restricted waters are attached as enclosures (6) and (7) respectively.

o. HEALY's characteristics and preliminary tactical data are attached as enclosures (8) and (9) respectfully.

[redacted]. RUSSELL

Encl.: (1) Standard Helm Commands
(2) Standard Line Commands
(3) Standard EOT/Bow Prop/Dynamic Positioning Commands
(4) Standard Anchorage Commands
(5) Standard Navigation Fix Plotting Symbols
(6) Checklist for Getting Underway
(7) Checklist for Entering Port/Restricted Waters
(8) Ship's Characteristics
(9) Preliminary Tactical Data
(10) Navigation Evaluator's Script

(b)(6) & (7)(C)

Helm Commands

This enclosure provides a list of Standard Helm commands for USCGC HEALY. Standard phraseology governing orders to the helmsman is required to ensure orders are understood and promptly executed. The helmsman shall repeat each command word-for-word and shall report when the ordered action is complete. The conning officer shall acknowledge the helmsman's responses with "VERY WELL".

COMMAND	ACTION
RIGHT (LEFT) FULL RUDDER	Full rudder is **30 degrees** rudder
STANDARD Rudder	Standard rudder is **20 degrees** rudder and the amount required to turn the ship on its standard tactical diameter.
HARD Rudder	Hard rudder is **35 degrees** rudder
RIGHT (LEFT) ## DEGREES RUDDER	Apply the ordered rudder. This order may be followed by a new course for the helmsman to steer, such as "STEADY ON COURSE 256" or another rudder command. If no course is specified the helmsman shall call out the heading at 10 degree increments, such as "PASSING 150, PASSING 160", until a course is ordered by the conning officer. This Applies for ALL TURNS.
INCREASE YOUR RUDDER TO DEGREES	Increase the rudder angle the amount specified to cause the ship to turn more rapidly.
EASE YOUR RUDDER	Decrease the rudder angle by half the amount currently applied or by the amount ordered.
RUDDER AMIDSHIPS	Place the rudder at zero degrees.
MEET HER	Use the rudder as necessary to check the swing of the ship without steadying on any specific course.
STEADY, STEADY AS SHE GOES, STEADY ON COURSE ###	Steer the course on which the ship is currently headed or the ordered course. If the ship is turning and the command STEADY or STEADY AS SHE GOES is given, the helmsman notes the heading and brings the ship back to the heading. The helmsman should then reply "STEADY; COURSE ###".
SHIFT YOUR RUDDER	Move the rudder to the same angle in the opposite direction from where it is currently ordered.
NOTHING TO THE RIGHT (LEFT) OF COURSE ###	Steer nothing to the right (left) of the course specified.
HOW'S YOUR RUDDER	This is a query from the conning officer to ascertain the current rudder placement. The helmsman replies, "MY RUDDER IS RIGHT(LEFT) ## DEGREES".
MARK YOUR HEAD	Respond "MARK ###". A command to the helmsman to state the heading of the ship at the moment the command was given.
COMMAND	The helmsman's response to the conning officer if he/she did not hear a command, misunderstood a command or believes a command is improper.
STEER ON	The helmsman steers on a range or object identified by the conning officer.
MIND YOUR HELM	A command issued by the Conning Officer, CO, Officer of the Deck (if separate), or the navigator to the helmsman to pay closer attention to his/her steering

Line Handling Commands

This enclosure provides a list of standard line handling commands for USCGC HEALY

COMMAND	ACTION
PUT OVER/PASS (line number)	Pass the specified line to the pier and provide enough slack to allow line handlers to place the line over the bitt, cleat or bollard.
HOLD (line number)	Do not let any more line out even though the risk of parting may exist.
CHECK (line number)	Hold heavy tension on the specified line but render it as necessary to prevent parting the line.
SURGE (line number)	Hold moderate tension on a line but render it enough to permit movement of the ship.
EASE (line number)	Let a line out until it is under less tension, but not slacked.
SLACK (line number)	Take all tension off a line.
TAKE THE SLACK OUT OF (line number)	Take all the slack out of a line, but do not take a strain.
SHIFT (line number)	Move a line to the specified location.
HEAVE AROUND ON (line number)	Take a strain on a line.
TAKE (line number) **TO POWER**	Take the specified line to the capstan or gypsy head.
SINGLE UP (line number)	Take in all but one bight so there remains a single part to the line. May also be used to single up all normal mooring lines.
DOUBLE UP (line number)	Pass an additional bight on the specified line so there are three parts to the line. This may also be used to double up all normal mooring lines. Cutters without sufficient mooring line for three parts should just pass the bitter end of the single up to the pier.
AVAST or AVAST HEAVING	Stop taking a strain on a line with capstan.
TAKE IN (line number)	Allow the pier line handler enough slack to take the line off the fitting and bring the line aboard. Used when secured with your own line.
CAST OFF (line number)	When you are secured with another ship's lines, it means to cast off the ends of their lines

STANDARD EOT COMMANDS

Pilothouse control:

ALL/PORT/STBD AHEAD/BACK __ (10-100) PERCENT – Move throttle to ordered percentage of total shaft RPM. Each 10% equals 16 shaft RPM.

10% = 16RMP	60% = 96RPM
20% = 32RPM	70% = 112RPM
30% = 48RPM	80% = 128RPM
40% = 64RPM	90% = 144RPM
50% = 80RPM	100% = 160RPM

ALL STOP - Move throttles to position 0..

Engineroom Control:

ALL/PORT/STBD AHEAD/BACK DEAD SLOW (20 Shaft RPM)

ALL/PORT/STBD AHEAD/BACK SLOW (40 Shaft RPM)

ALL/PORT/STBD AHEAD/BACK HALF (80 Shaft RPM)

ALL/PORT/STBD AHEAD/BACK FULL (160 Shaft RPM)

STANDARD BOW PROP COMMANDS

THRUST TO PORT/STBD ¼ - Move handle to ¼ thrust to move bow in direction indicated.

THRUST TO PORT/STBD ½ - Move handle to ½ thrust to move bow in direction indicated.

THRUST TO PORT/STBD ¾ - Move handle to ¾ thrust to move bow in direction indicated.

THRUST TO PORT/STBD FULL – Move handle to full power to move bow in direction indicated

Thrust to indicates the direction you want the bow to go!

STANDARD DYNAMIC POSITION SYSTEM COMMANDS

All commands are given when in Joystick Manual Heading (JSMH).

TWIST PORT/STBD ___ (0-100%) – Turn heading knob to ordered position

THRUST PORT/STBD ___(000-180) DEGREES, POSITION ___(0-10) – Turn Joystick to relative bearing ordered and put throttle to ordered position.

THRUST STOP/BACK, POSITION (0-10) – pull throttle back to ordered position. DO NOT CHANGE POSITION OF JOYSTICK.

ALL STOP - Place Joystick 000 degrees, Position 0.

Note: It is not recommended to rotate the joystick through 180 degrees with the thrust handle fully down.

Anchoring Commands

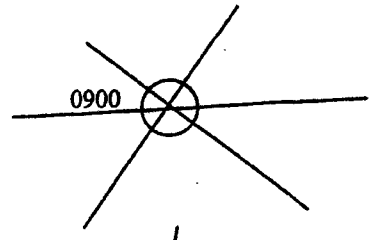
This enclosure provides a list of Standard Anchoring commands for USCGC HEALY. Standard phraseology governing orders to the Foc'sle / Bridge are required to ensure orders are understood and promptly executed. The Petty Officer in Charge of anchoring shall repeat each command word-for-word and shall report when the ordered action is complete. The Officer of the Deck shall acknowledge the Petty Officer in Charge of anchoring with "VERY WELL".

COMMAND / ACTION
FOC'SLE – CONN: WE'LL BE ANCHORING IN _____ FATHOMS OF WATER TO A _____ BOTTOM, USING THE ____ ANCHOR, ____ SHOTS OF CHAIN ON DECK. This gives the Anchor Detail Depth, Bottom Type, and Scope of Chain.
CONN -FOC'SLE: PORT/STBD ANCHOR IS READY FOR LETTING GO: The Ground Tackle is set up and only a few minor steps are required to drop the anchor.
FOC'SLE – CONN: _____ YARDS TO ANCHORAGE This command is given to keep the Anchor detail updated as the ship approaches the anchorage.
FOC'SLE – CONN: STAND BY: Anchor Detail will remove the mousing on the Pelican Hook Bale Pin, Pull the Pin and Release the Pelican Hook.
FOC'SLE – CONN: LET GO THE PORT/STBD ANCHOR: Anchor Detail will release the break immediately, Let the anchor fall or walk out the anchor depending on the bottom type, Pay out specified amount of chain. After the proper amount of chain is let out SET THE BREAK and PELICAN.
FOC'SLE – CONN: HOW DOES THE ANCHOR TEND Prompts the Anchor Detail to report how the Anchor chain is tending.
CONN - FOC'SLE : ANCHOR TENDS ___ O'CLOCK / UNDERFOOT, WITH A LIGHT/HEAVY STRAIN. Anchor Detail will continue to pass updates to the CONN until anchor is ready for ridding.
CONN - FOC'SLE : ANCHOR IS DRAGING OR WALKING ON THE BOTTOM. Anchor Flukes are NOT Digging into the bottom, but are alternately dragging or "walking" the bottom.
FOC'SLE – CONN: VEER TO ___ SHOTS ON DECK Instructs the Anchor Detail to let out more chain to the number of shots specified..
CONN - FOC'SLE : ANCHOR IS BROUGHT TO AND HOLDING Indicates anchor flukes have dug into the bottom and the anchor is holding the ship.
FOC'SLE – CONN: MAKE THE ANCHOR READY FOR RIDING Instructs the Anchor Detail to secure the Pelican Hook Bale Pin and disengage the anchor equipment.

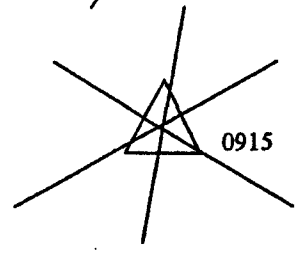
FOC'SLE – CONN: MAKE PREPERATIONS TO HEAVE AROUND ON THE PORT/STBD ANCHOR Instructs the Anchor Detail to pull the Pelican Hook Bale Pin and engage the anchor equipment.
CONN - FOC'SLE : PORT/STBD ANCHOR IS READY FOR HEAVING AROUND All Anchor equipment and Anchor Detail are ready to heave around, Pelican hook is removed.
FOC'SLE – CONN: HEAVE AROUND ON PORT/STBD ANCHOR Instructs the Anchor Detail to release break and heave around on the anchor chain.
FOC'SLE – CONN: HOW DOES THE ANCHOR TEND Prompts the Anchor Detail to report how the Anchor chain is tending.
CONN - FOC'SLE : ANCHOR TENDS ___ O'CLOCK / UNDERFOOT, WITH A LIGHT/HEAVY STRAIN. Anchor Detail will continue to pass updates to the CONN until anchor is ready for ridding.
CONN - FOC'SLE : ANCHOR'S AT SHORT STAY Anchor chain and the anchor ahank are free of the bottom, but the flukes are still dug into the bottom.
FOC'SLE – CONN: BREAK OUT PORT/STBD ANCHOR Resume heaving around on the anchor to break it free from the bottom, continue till the anchor is at the waters edge.
CONN - FOC'SLE : ANCHOR'S AWEIGH Anchor is completely free from the bottom.
CONN - FOC'SLE : ANCHOR'S IN SIGHT Anchor can be seen from the foc'sle.
CONN - FOC'SLE : ANCHOR IS AT THE WATERS EDEGE Anchor is at the waters edge and the ship is able to maneuver as needed.
CONN - FOC'SLE : ANCHOR IS CLEAR Anchor is clear and ready to be housed.
CONN - FOC'SLE : ANCHOR IS FOULED Anchor is NOT Clear and NOT ready to be housed.
CONN - FOC'SLE : PERMISSION TO HOUSE THE PORT/STBD ANCHOR. Request to resume heaving until the anchor shank is brought-to inside the hawse pipe.
FOC'SLE - CONN: HOUSE THE PORT/STBD ANCHOR Permission granted to house the anchor.
CONN - FOC'SLE : ANCHOR IS HOUSED Anchor has been seated into the house and is secured tight, break is set.
FOC'SLE – CONN: MAKE BOTH ANCHORS SECURED FOR SEA Instructs the Anchor Detail to secure anchors for sea.
CONN - FOC'SLE : ANCHORS ARE SECURED FOR SEA Anchor is secure, Pelican is set, and all anchoring equipment is secured.

STANDARD NAVIGATION FIX
PLOTTING SYMBOLS (PAPER PLOTS)

VISUAL BEARING FIX

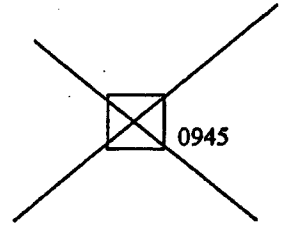


ELECTRONIC FIX (GPS, RADAR, LORAN, ADF)

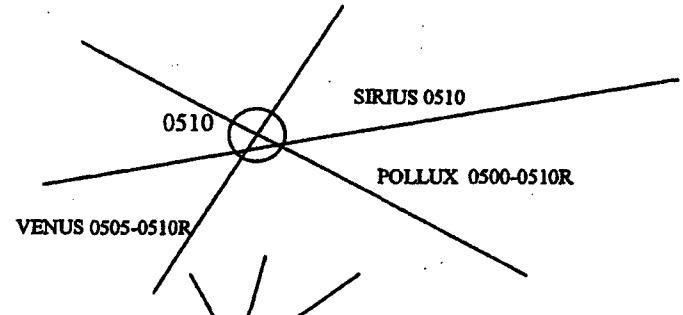


DEAD RECKONING POSITION

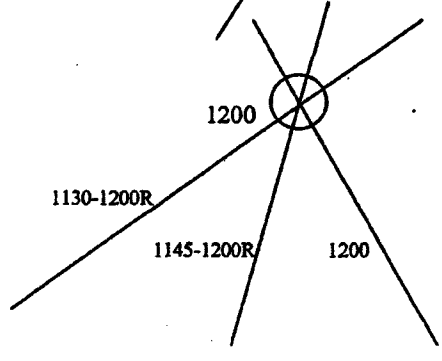
ESTIMATED POSITION



CELESTIAL FIX



RUNNING FIX



USCGC HEALY CHECKLIST
FOR GETTING UNDERWAY

48 Hours **DATE:**_____

_____ Energize and test all electronic equipment at all conning stations.
Coordinate with ET's. Report discrepancies to Navigator

RADAR_____VMS_____DPS_____GPS_____SDN_____
MPCMS_____VHF_____GMDSS_____AIS_____GYRO_____

_____ Energize and test all interior communications equipment.

1MC_____21MC_____ 45MC_____ 6MC_____

_____ Ensure Updated Charts and Voyage Plan are Loaded into VMS / Datum WGS-84

24 Hours

_____ Conduct Navigation Brief for CO, XO, OPS, OOD, Navigation Team.

_____ Ensure default settings are set in VMS, Safety Config / Units Menu / History

_____ Verify arrangements for tugs/ pilots/ line handlers.

_____ Energize Gyro and Repeaters. Confirm heading and alignment (Benchmark).
Determine and post gyro, steering, and navigation repeater errors

_____ Test all Navigation, Search, and Signal lights. discrepancies to EM's

_____ Ascertain schedule of other vessel movements in harbor.

_____ Check Navigation lights for proper operation.

_____ Energize all electronic equipment associated with the IBS.

_____ Test Steering in Manual mode.

_____ Draft / Send MOVEREP to OPS for Review.

1 Hour

_____ Break out Night Vision / Binoculars / Alidades / VHF-FM Radio

_____ Verify material condition Yoke is set throughout the ship.

_____ Record draft of cutter fore and aft. (LOG)

_____ Shift watch from the Quarterdeck to the Bridge (LOG)

_____ Reconfirm tugs/ pilots/ line handlers.

_____ Conduct muster of crew (Quarters)

_____ Ensure Steaming National Ensign is ready for hoisting.

_____ Broadcast SECURITY call IAW local policy.

_____ Brief OOD / Navigator that the checklist is done to this point.

_____ Post tides and currents on the bridge.

_____ Conduct radio checks with all bridge radios.

_____ Set up and check all harbor and tug radio frequencies.

_____ Ascertain schedule of other vessel movements in harbor.

30 Minutes

_____ MDG NR _____ ON-LINE, Secure ADG / SHIFT PWR(LOG)

_____ Set the Special Sea Detail (LOG)

_____ Test cutter's whistle/general alarms.

_____ Check steering in all available modes.

_____ Make anchor(s) ready for use.

_____ Standby to receive tugs and pilots. (LOG)

_____ Check into VTS when appropriate.

_____ Ensure stand-by charts are available to JOOD (FIX SHIPS POSITION)

30 Minutes

_____ Clear cutter of visitors.

_____ Single up all Lines, Remove all Shore Ties.

_____ Test Pilot House control of propulsion (Request CO'S Permission U/W OOD)

_____ Check Radar Error and Radar Chart Overlay

_____ Test Bow Thruster. (Request CO permission U/W OOD / OPS)

_____ Hoist international call sign (NEPP).

Underway

_____ LOG U/W and shift colors, haul down inport colors.

_____ Notify VTS once underway.

_____ Broadcast SECURITY call IAW local regulations.

_____ Verify location of pilot station and berth/anchorage from LOGREQ

_____ Haul Down Inport Colors and Pennants

_____ Change Status on AIS

_____ Plug in Bridge Phone

_____ Haul Down International call sign (NEPP).

_____ Return checklist to navigator for filing.

OFFICER OF THE DECK:_____

(REV 06/15/2006)

CHECKLIST FOR ENTERING PORT OR APPROACHING RESTRICTED WATERS

24 Hours **DATE:**_____

_____ Conduct Navigation Brief.

_____ Ensure Voyage Plan and current charts are loaded ECDIS-N and ECS

_____ Ensure stand-by charts are available to JOOD

_____ Post Tides and Currents on bridge chart table

_____ Verify location of pilot station and berth/anchorage from LOGREQ

_____ Draft / Send MOVEREP to OPS for Review.

3 Hours

_____ Determine and post gyro, steering, and navigation repeater errors and enter into electronic navigation system, as applicable.

1 Hour

_____ Pass the word, "Make all preparations for entering port. Cutter will anchor (berth _____ side to) at about _____. All hands shift into the Uniform of the Day."

_____ Lay out mooring lines

_____ Set the Navigation Detail. (LOG)

_____ Set up and check all harbor and tug radio frequencies.

_____ Check into VTS when appropriate.

_____ Ascertain schedule of other vessel movements in harbor.

30 Minutes

_____ Set the Special Sea Detail and Anchor Detail. (LOG)

_____ Test cutter's whistle/general alarms.

_____ Test Backing Bells and Bow Thruster

_____ Check steering in all available modes.

_____ Hoist international call sign (NEPP).

_____ Make anchor(s) ready for use.

_____ Inform the Anchor Detail of depth of water at anchorage, type of bottom, ready anchor, and scope of chain to be used.

30 Minutes

_____ Inform 1st LT. as to range of tide and time of high water.
_____ Receive readiness reports for entering port.
_____ Make SECURITE calls.
_____ Standby to receive tugs and pilots. (LOG)
_____ Ensure Inport colors are available to hoist (CLEAN)
_____ Ensure Inport LOG Binder is Ready to be used.

Upon Mooring

_____ Log MOORED _____ Depth_____ Position:_____
_____ Hoist inport Colors and Pennants
_____ Secure MDG and Start ADG (LOG)
_____ Secure Navigational radars as directed.
_____ Check out of VTS as appropriate.
_____ Secure Special Sea Detail. (LOG)
_____ If anchored, obtain navigation bearings and ranges (Anchor Log)
_____ If anchored, input information into VMS for Swing / Drag Circles
_____ Change Status on AIS
_____ Record draft of cutter fore and aft. (LOG)
_____ Haul down International Call Sign (LOG)
_____ Secure Night Vision / Binoculars / Alidades / VHF-FM Radio
_____ Log OFF GMDSS
_____ Connect Shore Ties: (LOG)
_____ Adjust Navigation Light Panel
_____ Shift watch from the Bridge to the Quarterdeck. (LOG)
_____ Un Plug Bridge Phone.
_____ Return checklist to navigator for filing.

OFFICER OF THE DECK:_____

(REV 06/15/2006)

SHIP'S NAVIGATIONAL CHARATERISTICS
USCGC HEALY (WAGB 20)

Length Overall	419' 9"
Length Between Perpendiculars	396' 6"
Length at Waterline	
Keel Length	230' 0"
Maximum Beam	82' 0"
Draft, Light Load	
Mean Draft (Full Load)	29' 3"
Displacement, Full Load	16,000 Long Tons
Displacement, Light Load	
Fuel Capacity (95 %)	1,189,562 Gallons
Fuel Capacity (100 %)	1,252,179 Gallons
Max Speed	18 Kts
Max Sustained Speed	12.5 Kts
Max Cruising Distance @ (ECON) Kts	16,000 @ 12.5 Kts
Mast Height Above Waterline	135'
Height of Bridge Deck Above Waterline (Deck level)	66'
Height of Aloft CONN (Deck level)	93'
Propellers	16' Diameter, 2 Fix Pitch, 4 Bladed
Rudder Type	Twin
Tactical Diameter	TBD
Final Diameter	TBD
Total Shaft (Both) Horsepower	30,000HP @ 130 RPM
Icebreaking Capability	4.5 FT @ 3 Kts Continuous

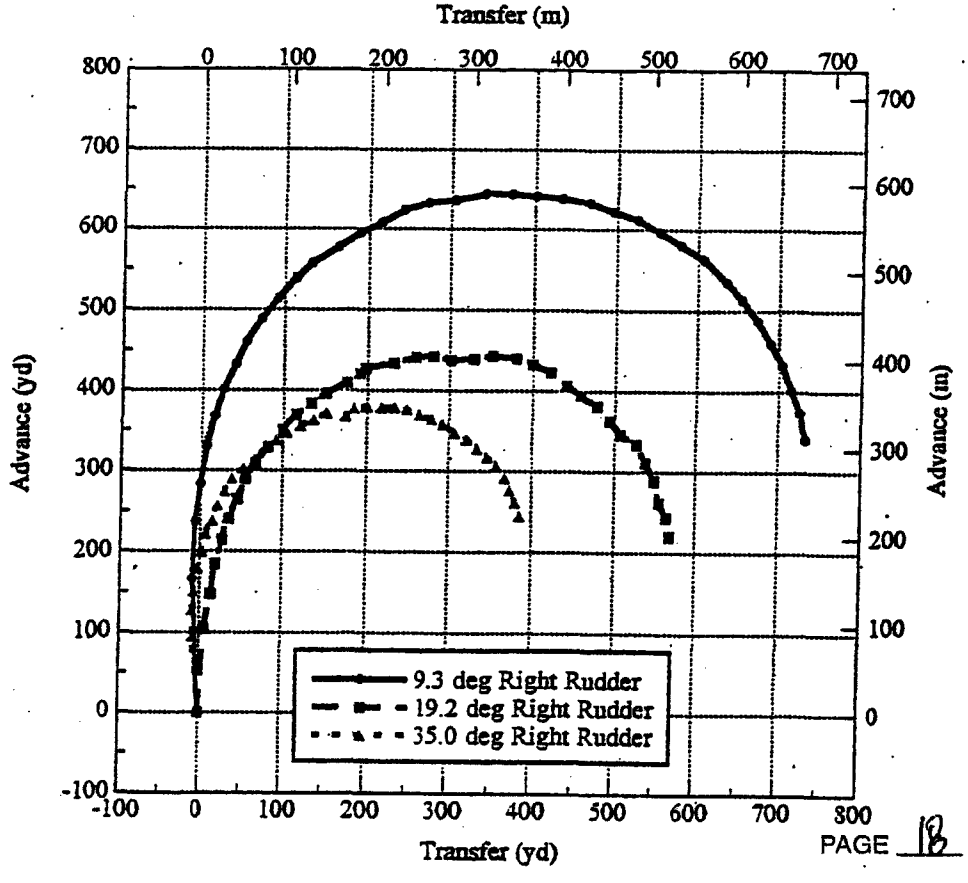
USCGC HEALY (WAGB 20)

Standardization Trials Results
25-26 August 1999 -- 16,412 LT

Ship Speed (knots)	Shaft Speed (rpm)
8.0	68.1
8.5	72.9
9.0	77.6
9.5	82.4
10.0	87.1
10.5	91.9
11.0	96.6
11.5	101.4
12.0	106.1
12.5	110.9
13.0	115.6
13.5	120.4
14.0	125.1
14.5	129.9
15.0	134.6
15.5	139.4
16.0	144.1
16.5	148.9
17.0	153.6
17.5	158.4
17.5	158.4

USCGC HEALY (WAGB 20)
Tactical Trial Results
Advance versus Transfer
Nominal Approach Speed of 8 knots

Change of Heading (deg)	9.3 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	19.2 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	35.0 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)
0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0
10	52	237 | 217	-5 | -5	32	148 | 135	14 | 13	29	127 | 116	-9 | -9
20	73	331 | 303	7 | 7	46	215 | 196	27 | 25	41	179 | 164	-2 | -2
30	90	401 | 367	27 | 25	59	265 | 242	45 | 42	51	222 | 203	7 | 7
40	106	460 | 421	54 | 49	71	310 | 283	67 | 61	61	258 | 235	21 | 19
50	121	515 | 471	93 | 85	83	351 | 321	100 | 91	71	290 | 265	38 | 35
60	136	557 | 510	134 | 122	95	384 | 351	134 | 122	81	315 | 288	66 | 61
70	151	595 | 544	190 | 174	107	410 | 375	176 | 161	91	338 | 309	92 | 84
80	166	624 | 570	243 | 222	119	427 | 391	198 | 181	101	355 | 325	122 | 111
90	183	636 | 581	306 | 280	132	442 | 404	259 | 236	111	371 | 339	152 | 139
100	200	643 | 588	373 | 341	144	438 | 401	302 | 276	122	377 | 345	185 | 169
110	216	638 | 584	433 | 396	157	444 | 406	351 | 321	133	379 | 347	218 | 199
120	233	622 | 569	497 | 454	171	433 | 395	399 | 365	144	375 | 343	248 | 227
130	249	596 | 545	554 | 507	185	407 | 372	441 | 403	155	364 | 333	280 | 256
140	266	562 | 514	608 | 556	198	382 | 349	478 | 437	167	347 | 317	308 | 282
150	282	514 | 470	654 | 598	212	346 | 316	508 | 465	179	328 | 300	334 | 305
160	299	460 | 421	690 | 631	227	311 | 285	539 | 492	191	307 | 281	357 | 327
170	316	402 | 368	716 | 654	242	262 | 239	556 | 508	203	276 | 253	374 | 342
180	332	340 | 311	735 | 672	256	220 | 201	569 | 520	215	245 | 224	386 | 353



Preliminary

11 ENCLOSURE (9)

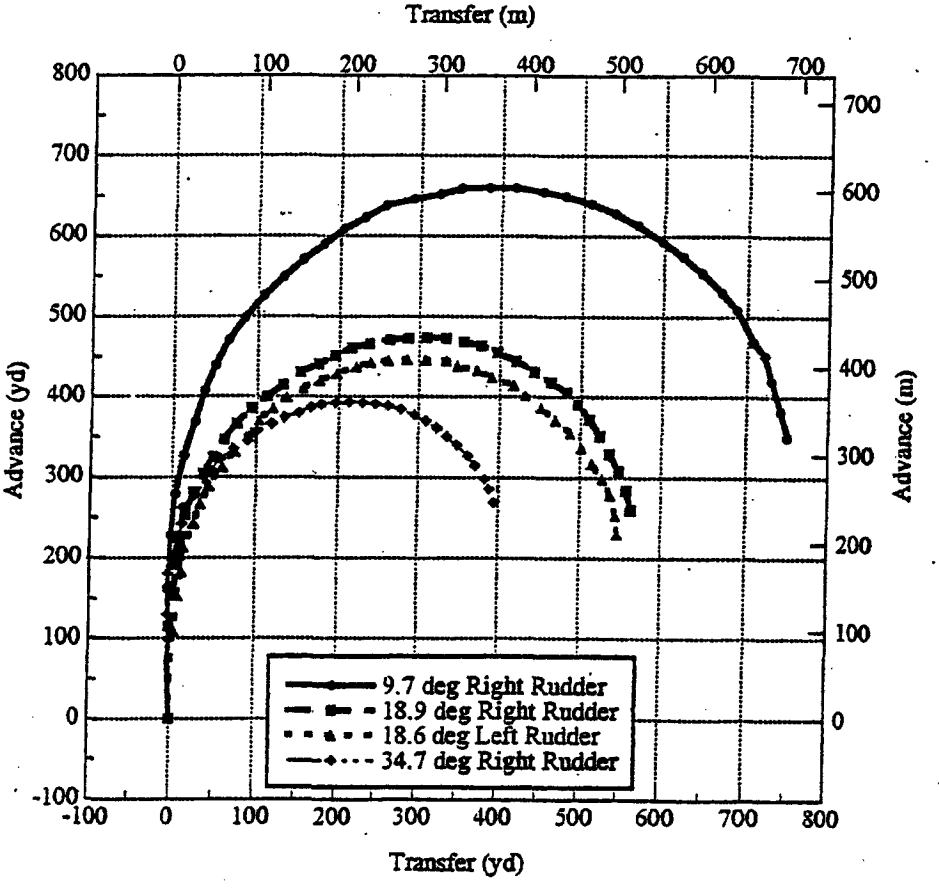
USCGC HEALY (WAGB 20)

Tactical Trial Results
Advance versus Transfer
Nominal Approach Speed of 8 knots
26 August 1999

Change of Heading (deg)	Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)
0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0
5	38	167 | 153	-8 | -8	22	104 | 95	6 | 5	21	95 | 87	-9 | -8
10	52	237 | 217	-5 | -5	32	148 | 135	14 | 13	29	127 | 116	-9 | -9
15	63	284 | 260	0 | 0	39	185 | 169	19 | 18	35	151 | 138	-8 | -7
20	73	331 | 303	7 | 7	46	215 | 196	27 | 25	41	179 | 164	-2 | -2
25	82	367 | 336	17 | 15	53	241 | 220	34 | 31	46	200 | 183	2 | 2
30	90	401 | 367	27 | 25	59	265 | 242	45 | 42	51	222 | 203	7 | 7
35	98	433 | 396	42 | 38	65	290 | 265	55 | 50	56	238 | 218	16 | 14
40	106	460 | 421	54 | 49	71	310 | 283	67 | 61	61	258 | 235	21 | 19
45	113	488 | 446	73 | 66	77	329 | 301	82 | 75	66	274 | 251	30 | 27
50	121	515 | 471	93 | 85	83	351 | 321	100 | 91	71	290 | 265	38 | 35
55	128	539 | 493	115 | 105	89	369 | 337	116 | 106	76	303 | 277	53 | 48
60	136	557 | 510	134 | 122	95	384 | 351	134 | 122	81	315 | 288	66 | 61
65	144	578 | 529	165 | 151	101	396 | 362	152 | 139	86	329 | 300	80 | 73
70	151	595 | 544	190 | 174	107	410 | 375	176 | 161	91	338 | 309	92 | 84
75	159	609 | 557	216 | 198	113	421 | 385	192 | 175	95	347 | 318	105 | 96
80	166	624 | 570	243 | 222	119	427 | 391	198 | 181	101	355 | 325	122 | 111
85	175	633 | 579	274 | 250	125	434 | 397	231 | 211	106	363 | 332	138 | 126
90	183	636 | 581	306 | 280	132	442 | 404	259 | 236	111	371 | 339	152 | 139
95	191	644 | 589	342 | 312	138	443 | 405	281 | 257	116	367 | 336	175 | 160
100	200	643 | 588	373 | 341	144	438 | 401	302 | 276	122	377 | 345	185 | 169
105	207	641 | 586	403 | 368	151	439 | 402	329 | 301	127	379 | 347	200 | 183
110	216	638 | 584	433 | 396	157	444 | 406	351 | 321	133	379 | 347	218 | 199
115	224	633 | 579	467 | 427	165	440 | 402	380 | 347	138	379 | 347	233 | 213
120	233	622 | 569	497 | 454	171	433 | 395	399 | 365	144	375 | 343	248 | 227
125	241	612 | 560	526 | 481	178	423 | 386	421 | 385	149	370 | 338	264 | 241
130	249	596 | 545	554 | 507	185	407 | 372	441 | 403	155	364 | 333	280 | 256
135	258	580 | 530	580 | 531	191	394 | 360	457 | 418	161	358 | 327	293 | 268
140	266	562 | 514	608 | 556	198	382 | 349	478 | 437	167	347 | 317	308 | 282
145	275	535 | 489	636 | 582	205	363 | 332	494 | 452	173	339 | 310	322 | 294
150	282	514 | 470	654 | 598	212	346 | 316	508 | 465	179	328 | 300	334 | 305
155	291	487 | 446	674 | 616	220	334 | 305	528 | 483	185	318 | 291	347 | 317
160	299	460 | 421	690 | 631	227	311 | 285	539 | 492	191	307 | 281	357 | 327
165	307	432 | 395	705 | 644	234	289 | 264	550 | 503	197	292 | 267	368 | 336
170	316	402 | 368	716 | 654	242	262 | 239	556 | 508	203	276 | 253	374 | 342
175	324	375 | 343	727 | 664	249	244 | 223	565 | 517	209	262 | 239	381 | 348
180	332	340 | 311	735 | 672	256	220 | 201	569 | 520	215	245 | 224	386 | 353

USCGC HEALY (WAGB 20)
Tactical Trial Results
Advance versus Transfer
Nominal Approach Speed of 12.5 knots

Change of Heading (deg)	9.7 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	18.9 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	18.6 deg Left Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	34.7 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)
0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0
10	32	148 | 135	14 | 13	22	156 | 143	5 | 4	22	153 | 140	8 | 7	18	130 | 119	-5 | -4
20	46	215 | 196	27 | 25	32	226 | 207	10 | 9	31	214 | 195	15 | 14	26	181 | 165	-3 | -3
30	59	265 | 242	45 | 42	41	281 | 257	26 | 24	39	267 | 244	35 | 32	32	223 | 204	7 | 6
40	71	310 | 283	67 | 61	48	325 | 297	49 | 45	47	313 | 286	60 | 55	39	263 | 240	14 | 13
50	83	351 | 321	100 | 91	56	367 | 336	76 | 70	55	355 | 325	93 | 85	45	293 | 268	40 | 37
60	95	384 | 351	134 | 122	64	400 | 366	112 | 102	62	386 | 353	119 | 109	51	322 | 294	57 | 52
70	107	410 | 375	176 | 161	73	431 | 394	153 | 140	70	411 | 376	157 | 143	58	345 | 316	89 | 82
80	119	427 | 391	198 | 181	80	451 | 413	195 | 178	77	429 | 393	198 | 181	65	366 | 335	117 | 107
90	132	442 | 404	259 | 236	89	467 | 427	239 | 218	85	443 | 405	241 | 221	72	380 | 348	151 | 138
100	144	438 | 401	302 | 276	97	473 | 433	287 | 262	93	447 | 409	286 | 262	78	390 | 357	179 | 164
110	157	444 | 406	351 | 321	106	473 | 432	333 | 304	101	445 | 407	334 | 305	85	393 | 359	213 | 195
120	171	433 | 395	399 | 365	115	463 | 423	377 | 345	110	433 | 396	372 | 340	93	390 | 357	247 | 226
130	185	407 | 372	441 | 403	124	444 | 406	420 | 384	119	415 | 379	417 | 381	100	384 | 351	279 | 255
140	198	382 | 349	478 | 437	133	418 | 383	463 | 423	127	387 | 354	451 | 413	108	369 | 338	309 | 283
150	212	346 | 316	508 | 465	142	391 | 357	496 | 454	136	355 | 325	488 | 446	116	350 | 320	335 | 307
160	227	311 | 285	539 | 492	151	352 | 321	524 | 479	146	317 | 290	516 | 471	124	326 | 298	362 | 331
170	242	262 | 239	556 | 508	160	308 | 282	549 | 502	155	279 | 255	538 | 492	132	298 | 272	383 | 350
180	256	220 | 201	569 | 520	170	260 | 238	563 | 515	164	231 | 211	547 | 501	140	269 | 246	394 | 360



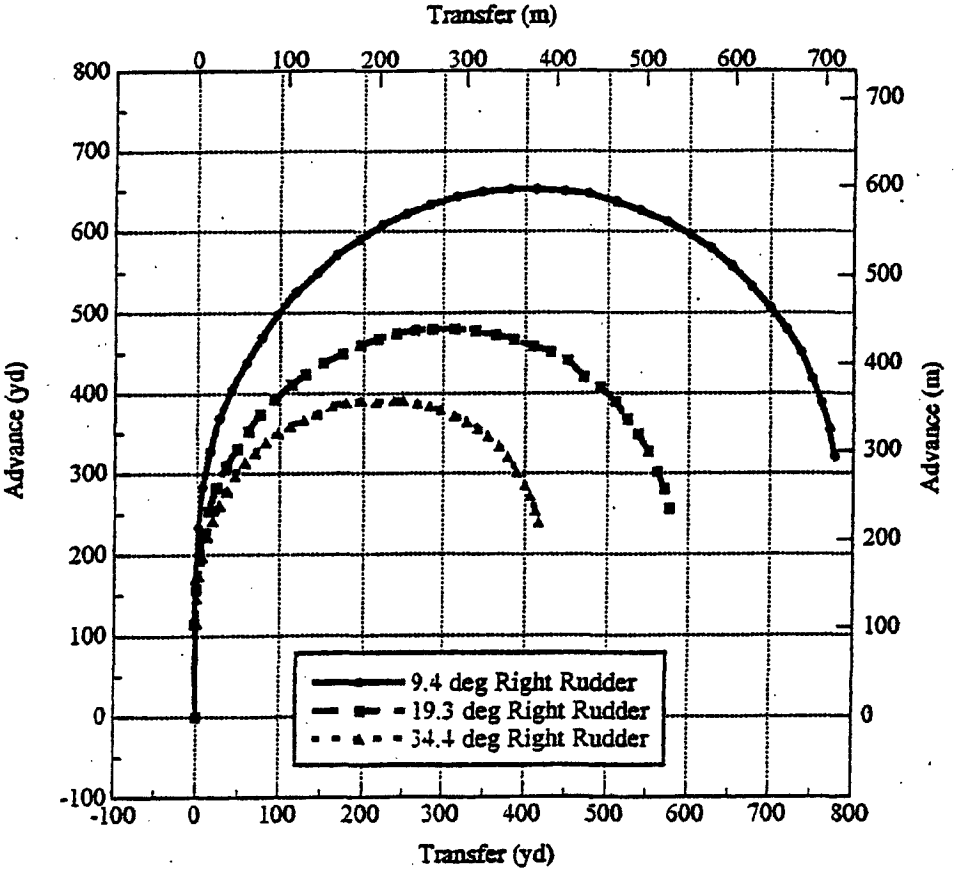
USCGC HEALY (WAGB 20)

Tactical Trial Results
Advance versus Transfer
Nominal Approach Speed of 12.5 knots
26 August 1999

Change of Heading (deg)	9.7 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	18.9 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	18.6 deg Left Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	34.7 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)
0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0
5	22	104 | 95	6 | 5	16	115 | 106	-2 | -2	16	109 | 100	5 | 5	14	98 | 89	-2 | -2
10	32	148 | 135	14 | 13	22	156 | 143	5 | 4	22	153 | 140	8 | 7	18	130 | 119	-5 | -4
15	39	185 | 169	19 | 18	28	192 | 176	8 | 7	26	184 | 168	13 | 11	22	159 | 145	-4 | -3
20	46	215 | 196	27 | 25	32	226 | 207	10 | 9	31	214 | 195	15 | 14	26	181 | 165	-3 | -3
25	53	241 | 220	34 | 31	37	254 | 233	17 | 15	35	243 | 222	27 | 25	29	202 | 185	2 | 2
30	59	265 | 242	45 | 42	41	281 | 257	26 | 24	39	267 | 244	35 | 32	32	223 | 204	7 | 6
35	65	290 | 265	55 | 50	45	304 | 278	37 | 34	43	289 | 264	45 | 41	35	242 | 221	13 | 12
40	71	310 | 283	67 | 61	48	325 | 297	49 | 45	47	313 | 286	60 | 55	39	263 | 240	14 | 13
45	77	329 | 301	82 | 75	52	347 | 317	62 | 57	50	332 | 303	75 | 68	42	277 | 253	27 | 25
50	83	351 | 321	100 | 91	56	367 | 336	76 | 70	55	355 | 325	93 | 85	45	293 | 268	40 | 37
55	89	369 | 337	116 | 106	60	386 | 353	93 | 85	58	370 | 338	103 | 94	48	307 | 281	48 | 44
60	95	384 | 351	134 | 122	64	400 | 366	112 | 102	62	386 | 353	119 | 109	51	322 | 294	57 | 52
65	101	396 | 362	152 | 139	68	415 | 380	131 | 120	66	399 | 365	137 | 125	55	335 | 306	72 | 66
70	107	410 | 375	176 | 161	73	431 | 394	153 | 140	70	411 | 376	157 | 143	58	345 | 316	89 | 82
75	113	421 | 385	192 | 175	77	441 | 403	175 | 160	73	421 | 385	176 | 161	61	357 | 326	100 | 91
80	119	427 | 391	198 | 181	80	451 | 413	195 | 178	77	429 | 393	198 | 181	65	366 | 335	117 | 107
85	125	434 | 397	231 | 211	85	461 | 421	216 | 198	81	438 | 400	222 | 203	68	374 | 342	133 | 122
90	132	442 | 404	259 | 236	89	467 | 427	239 | 218	85	443 | 405	241 | 221	72	380 | 348	151 | 138
95	138	443 | 405	281 | 257	93	471 | 430	264 | 241	89	445 | 407	262 | 240	75	387 | 354	166 | 152
100	144	438 | 401	302 | 276	97	473 | 433	287 | 262	93	447 | 409	286 | 262	78	390 | 357	179 | 164
105	151	439 | 402	329 | 301	102	474 | 433	310 | 284	97	446 | 408	308 | 282	82	392 | 358	196 | 179
110	157	444 | 406	351 | 321	106	473 | 432	333 | 304	101	445 | 407	334 | 305	85	393 | 359	213 | 195
115	165	440 | 402	380 | 347	110	469 | 428	356 | 325	105	438 | 401	348 | 318	89	392 | 358	231 | 211
120	171	433 | 395	399 | 365	115	463 | 423	377 | 345	110	433 | 396	372 | 340	93	390 | 357	247 | 226
125	178	423 | 386	421 | 385	119	455 | 416	397 | 363	114	425 | 388	391 | 357	97	388 | 355	263 | 241
130	185	407 | 372	441 | 403	124	444 | 406	420 | 384	119	415 | 379	417 | 381	100	384 | 351	279 | 255
135	191	394 | 360	457 | 418	128	431 | 394	442 | 404	123	402 | 367	431 | 394	104	376 | 344	295 | 270
140	198	382 | 349	478 | 437	133	418 | 383	463 | 423	127	387 | 354	451 | 413	108	369 | 338	309 | 283
145	205	363 | 332	494 | 452	137	406 | 371	482 | 441	132	372 | 340	469 | 429	112	361 | 330	322 | 295
150	212	346 | 316	508 | 465	142	391 | 357	496 | 454	136	355 | 325	488 | 446	116	350 | 320	335 | 307
155	220	334 | 305	528 | 483	146	372 | 340	511 | 468	141	336 | 307	502 | 459	120	340 | 311	348 | 318
160	227	311 | 285	539 | 492	151	352 | 321	524 | 479	146	317 | 290	516 | 471	124	326 | 298	362 | 331
165	234	289 | 264	550 | 503	156	330 | 301	536 | 490	150	299 | 274	528 | 483	128	314 | 287	370 | 339
170	242	262 | 239	556 | 508	160	308 | 282	549 | 502	155	279 | 255	538 | 492	133	298 | 272	383 | 350
175	249	244 | 223	565 | 517	165	284 | 260	558 | 510	159	255 | 233	545 | 498	136	286 | 261	388 | 354
180	256	220 | 201	569 | 520	170	260 | 238	563 | 515	164	231 | 211	547 | 501	140	269 | 246	394 | 360

USCGC HEALY (WAGB 20)
Tactical Trial Results
Advance versus Transfer
Nominal Approach Speed of 16.5 knots

Change of Heading (deg)	9.4 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	19.3 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	34.4 deg Right Rudder: Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)
0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0
10	25	233 | 213	3 | 2	17	158 | 144	0 | 0	16	147 | 135	0 | 0
20	36	328 | 300	17 | 15	25	227 | 207	9 | 8	22	198 | 181	7 | 7
30	44	404 | 370	42 | 38	32	283 | 259	25 | 22	27	242 | 221	20 | 18
40	53	470 | 429	78 | 71	38	331 | 303	48 | 44	32	278 | 255	37 | 34
50	61	527 | 481	119 | 109	44	374 | 342	76 | 69	37	314 | 287	58 | 53
60	68	572 | 523	168 | 154	50	411 | 376	115 | 105	42	340 | 311	83 | 76
70	76	609 | 557	223 | 204	56	438 | 401	151 | 138	47	360 | 329	113 | 103
80	84	633 | 579	284 | 260	62	460 | 421	197 | 180	52	375 | 343	145 | 132
90	91	649 | 593	348 | 318	69	475 | 435	241 | 220	57	388 | 355	180 | 164
100	99	652 | 596	414 | 378	75	480 | 439	288 | 263	62	389 | 356	216 | 198
110	107	647 | 591	477 | 436	82	478 | 437	339 | 310	68	392 | 358	250 | 229
120	115	626 | 572	541 | 494	89	467 | 427	386 | 353	74	384 | 351	285 | 260
130	124	595 | 544	602 | 550	95	451 | 412	431 | 394	79	373 | 341	315 | 288
140	132	558 | 510	653 | 597	102	420 | 384	472 | 431	85	356 | 325	343 | 313
150	140	507 | 463	700 | 640	109	389 | 356	510 | 466	91	334 | 305	369 | 337
160	148	450 | 412	738 | 674	116	349 | 319	538 | 492	98	302 | 276	390 | 357
170	157	388 | 355	762 | 697	123	301 | 276	562 | 514	103	273 | 250	407 | 372
180	165	321 | 293	779 | 712	130	257 | 235	577 | 528	109	240 | 219	417 | 381



USCGC HEALY (WAGB 20)

Tactical Trial Results
Advance versus Transfer
Nominal Approach Speed of 16.5 knots
26 August 1999

Change of Heading (deg)	9.4 deg Right Rudder			19.3 deg Right Rudder			34.4 deg Right Rudder		
	Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)	Time to Change of Heading (s)	Advance (yd) | (m)	Transfer (yd) | (m)
0	0	0 | 0	0 | 0	0	0 | 0	0 | 0	0	0 | 0	0 | 0
5	18	165 | 151	-1 | -1	13	115 | 105	-3 | -3	12	116 | 106	1 | 1
10	25	233 | 213	3 | 2	17	158 | 144	0 | 0	16	147 | 135	0 | 0
15	30	284 | 259	8 | 7	21	193 | 177	4 | 4	19	175 | 160	3 | 3
20	36	328 | 300	17 | 15	25	227 | 207	9 | 8	22	198 | 181	7 | 7
25	40	369 | 337	28 | 25	28	254 | 232	16 | 14	25	223 | 204	14 | 13
30	44	404 | 370	42 | 38	32	283 | 259	25 | 22	27	242 | 221	20 | 18
35	49	438 | 400	59 | 54	35	309 | 283	36 | 33	29	261 | 239	28 | 26
40	53	470 | 429	78 | 71	38	331 | 303	48 | 44	32	278 | 255	37 | 34
45	56	498 | 455	96 | 88	41	352 | 322	62 | 56	34	298 | 272	46 | 42
50	61	527 | 481	119 | 109	44	374 | 342	76 | 69	37	314 | 287	58 | 53
55	65	550 | 503	145 | 132	47	392 | 359	93 | 85	39	327 | 299	70 | 64
60	68	572 | 523	168 | 154	50	411 | 376	115 | 105	42	340 | 311	83 | 76
65	72	590 | 540	196 | 179	53	424 | 388	130 | 119	44	351 | 321	98 | 90
70	76	609 | 557	223 | 204	56	438 | 401	151 | 138	47	360 | 329	113 | 103
75	80	622 | 569	253 | 231	59	450 | 411	175 | 160	49	368 | 336	129 | 118
80	84	633 | 579	284 | 260	62	460 | 421	197 | 180	52	375 | 343	145 | 132
85	88	643 | 588	317 | 290	66	468 | 428	218 | 199	54	385 | 352	164 | 150
90	91	649 | 593	348 | 318	69	475 | 435	241 | 220	57	388 | 355	180 | 164
95	95	652 | 596	381 | 348	72	479 | 438	265 | 242	60	391 | 358	198 | 181
100	99	652 | 596	414 | 378	75	480 | 439	288 | 263	62	389 | 356	216 | 198
105	103	650 | 594	448 | 410	79	481 | 439	315 | 288	66	392 | 358	238 | 218
110	107	647 | 591	477 | 436	82	478 | 437	339 | 310	68	392 | 358	250 | 229
115	112	636 | 582	512 | 468	85	472 | 432	364 | 333	71	388 | 355	268 | 245
120	115	626 | 572	541 | 494	89	467 | 427	386 | 353	74	384 | 351	285 | 260
125	120	611 | 559	574 | 525	92	458 | 419	410 | 375	76	380 | 347	297 | 272
130	124	595 | 544	602 | 550	95	451 | 412	431 | 394	79	373 | 341	315 | 288
135	128	579 | 530	627 | 574	98	441 | 403	452 | 413	82	364 | 333	330 | 301
140	132	558 | 510	653 | 597	102	420 | 384	472 | 431	85	356 | 325	343 | 313
145	136	532 | 487	677 | 619	105	407 | 372	492 | 450	88	346 | 317	356 | 325
150	140	507 | 463	700 | 640	109	389 | 356	510 | 466	91	334 | 305	369 | 337
155	144	479 | 438	720 | 658	112	367 | 335	525 | 480	94	320 | 293	379 | 347
160	148	450 | 412	738 | 674	116	349 | 319	538 | 492	98	302 | 276	390 | 357
165	153	418 | 382	751 | 687	119	327 | 299	551 | 504	101	286 | 261	400 | 365
170	157	388 | 355	762 | 697	123	301 | 276	562 | 514	103	273 | 250	407 | 372
175	161	354 | 324	772 | 706	126	280 | 256	571 | 522	107	255 | 233	413 | 378
180	165	321 | 293	779 | 712	130	257 | 235	577 | 528	109	240 | 219	417 | 381

NAVIGATION EVALUATION SCRIPT

_____ Electronically _____ YDS Left/Right of track. *Concur/Do not Concur.*

Recommend come Left/Right to _____/Maintain.

_____ Depth beneath the keel.

Nearest hazard to navigation _____ (Type) _____ YDS. Port/STBD/Bow/Beam/QTR.

Distance remaining _____. Time to turn _____, next course _____.